

Docket No. MCGEP0178USA

Serial No. 10/002,714

**REMARKS**

Claims 1-29 are pending in the present application. Applicants respectfully submit that the presently claimed invention patentably distinguishes over the prior art in general and over the asserted combination of Nakayama et al. and Tanimoto et al. in particular. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections of Applicants' claims over the asserted combination of references, for at least the reasons set forth in the following.

The pending claims are not substantively amended herein. Although the instructions relating to the new amendment format are not clear on this point, since Applicants have not amended the claims, no complete set of claims is deemed necessary as part of the present Reply. The originally filed claims remain the claims of record in this application. If the Examiner requires a complete set of claims, Applicants' undersigned attorney respectfully requests the Examiner to so indicate.

Applicants submit herewith a drawing in response to the Examiner's request therefor. The specification has been amended to incorporate a Brief Description of the Drawing, at page 6, between original lines 10 and 11, in which Fig. 1 is mentioned. A more detailed description of the drawing figure has been added at page 6, at the beginning of the Description of the Preferred Embodiments, following original line 11. Applicants submit that the drawing and the descriptions thereof contain no new matter, and are fully supported in the original specification as filed. Applicants request the Examiner to enter the drawing and to indicate approval thereof.

**Claim Rejections**

In the Office Action, claims 1-29 stand rejected as obvious over Nakayama et al., U.S. Patent No. 4,935,312, hereafter Nakayama, in view of Tanimoto et al., U.S. Patent No. 6,110,608, hereafter Tanimoto. Applicant respectfully traverses these rejections for at least the following reasons.

Docket No. MCGEP0178USA

Serial No. 10/002,714

With respect to claims 1 and 12, and by implication to claim 22, the Examiner asserted that Nakayama discloses copper- or copper alloy-containing electrical circuitry on a PCB, and a final finish on the circuitry, in which the final finish comprises a coating of tin on the copper or copper alloy circuitry and a cap layer on the tin coating. The Examiner first asserted that the Nakayama cap layer is an alloy cap layer, but then admitted that the "alloy" cap layer of Nakayama is of indium only, i.e., it is not an alloy.

The Examiner attempted to make up for this deficiency in Nakayama by asserting that the alloy cap layer of two immersion platable metals is known in the art for better solderability. The Examiner cited Tanimoto in apparent support of this assertion. The Examiner concluded that it would have been obvious to provide the circuit board of Nakayama with the alloy cap layer of Tanimoto. With respect to claims 22, 25 and 26, the Examiner asserted that the process limitation defines the claimed invention over the art to the degree that it defines the product itself, and a process limitation cannot serve to distinguish over the art if the product is obvious over the art.

Nakayama discloses film carriers for mounting electronic components such as semiconductor chips thereon which have lead portions, such as copper, plated with a tin or tin alloy layer and further with an indium layer. Abstract.

Tanimoto discloses a lead material on which is formed a double-layer structure: a first electroplated layer; and a second electroplated layer. Col. 4, lines 5-8. Tanimoto et al teach the melting temperature of the uppermost layer, that is, the second electroplated layer, is lower than the melting temperature of the lowermost, first electroplated layer. Col. 4, lines 8-14. Either of Tanimoto's layers may be tin or tin alloy; the critical distinction is that the uppermost layer should have a melting point lower than the lowermost layer. See, e.g., claim 1 of Tanimoto. Tanimoto fails to teach or suggest immersion plating of any metal.

The Examiner's asserted combination of Nakayama and Tanimoto cannot render obvious Applicants' claimed invention, since the combination fails to disclose all the

Docket No. MCGEP0178USA

Serial No. 10/002,714

features of Applicants' claimed invention, there is no motivation to make the asserted combination, and there can be no expectation of success in the asserted combination.

**1. Nakayama Teaches Away From the Asserted Combination.**

Nakayama teaches away from the use of an alloy cap layer. At col. 2, lines 48-55, Nakayama mentions the problem of tin whiskering, and states that one prior art attempted solution was "(2) Coating with an codeposited alloy of tin with nickel, copper, bismuth, antimony, or other metal." [sic].

Following the description of these prior art treatment methods, from col. 2, line 66 to col. 3, line 7, Nakayama states that none of the prior art treatments proved satisfactory for this purpose. With specific reference to method (2), Nakayama states

The method (2) is questionable in effects and is likely to affect adversely the corrosion resistance and solderability of the plating, with deterioration of electrical properties and other shortcomings.

In view of this clear and unequivocal teaching away from the use of tin alloy coatings, no person of ordinary skill in the art would be motivated to attempt the combination of Nakayama and Tanimoto.

Since there is not motivation for making the asserted combination, there can be no *prima facie* case of obviousness of the presently claimed invention over the asserted combination of Nakayama in view of Tanimoto. Accordingly, Applicants respectfully request the withdrawal of the rejections over these references.

**2. Tanimoto Does Not Disclose Immersion Plating.**

Tanimoto does not disclose that the metals in its alloy layer are immersion-platable metals. Tanimoto at no time mentions that the metals are immersion platable. While it may be known in the art to apply such metals by immersion plating, there is no teaching

Docket No. MCGEP0178USA

Serial No. 10/002,714

or suggestion in Tanimoto that any alloyed metals should or could be immersion plated. Tanimoto relies on electroplating only.

Thus, prior to Applicants' invention, a person of ordinary skill in the art with both references in hand would not be led to modify Nakayama, by replacing the indium cap layer with an alloy cap layer of immersion-platable metals since, even if one was to consider the alloy of Tanimoto in spite of the express teaching away in Nakayama, one still would have no reason to immersion plate the alloy.

For the foregoing reason, there can be no *prima facie* case of obviousness of the presently claimed invention over Nakayama in view of Tanimoto. Accordingly, Applicants respectfully request the withdrawal of the rejections over these references.

### **3. There Is No Reasonable Expectation of Success.**

In order for an asserted combination of references to render obvious a claimed invention, there must be a reasonable expectation of success that the allegedly obvious invention would be obtained by the combination. In the present case, no such showing has been or can be made. Since Nakayama clearly teaches away from the use of alloy cap layer, and since Tanimoto fails to disclose or suggest immersion plating, there can be no reasonable expectation of success in obtaining the presently claimed invention by making the asserted combination.

For the foregoing reason, there is no *prima facie* case of obviousness of the presently claimed invention over Nakayama in view of Tanimoto. Accordingly, Applicants respectfully request the withdrawal of the rejections over these references.

### **4. All the Claim Limitations Are Not Disclosed in the References.**

Since Tanimoto fails to teach or suggest immersion plating, or that the metals it does disclose could be immersion plated, and since Nakayama teaches away from using an alloy cap layer by any method, the asserted combination of prior art references fails to disclose all the limitations of Applicants' claims.

Docket No. MCGEP0178USA

Serial No. 10/002,714

For this reason, there is no *prima facie* case of obviousness of the presently claimed invention over Nakayama in view of Tanimoto. Accordingly, Applicants respectfully request the withdrawal of the rejections over these references.

**5. The Legal Requirements for *Prima Facie* Obviousness Have Not Been Met.**

As shown by the foregoing, the Examiner has failed to state a legally proper case of *prima facie* obviousness. To establish *prima facie* case of obviousness, the Examiner must establish: (1) some suggestion or motivation either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; (2) a reasonable expectation of success; and (3) that the prior art references must teach or suggest all the claim limitations. See MPEP 706.02(j)). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not be based on the applicants' disclosure. *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991).

First, in the present case, there can be no motivation to combine the reference teachings, since Nakayama clearly and unequivocally teaches away from an alloy cap layer. See, *In re Gurley*, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994) (" [A] reference will teach away if it suggests that the line of development flowing from the reference's disclosures is unlikely to be productive of the result sought by the applicant."). Nakayama indisputably teaches away from an alloy cap layer such as that of Tanimoto. There can be no motivation or suggestion to combine when the prior art teaches away from the combination.

Second, because of the teaching away, and because Tanimoto fails to teach or suggest immersion plating, there can be no reasonable expectation of success.

Third, because Tanimoto fails to teach or suggest immersion plating, or that the metals it does disclose are immersion platable, the asserted combination fails to include all the limitations of Applicants' claims.

Docket No. MCGEP0178USA

Serial No. 10/002,714

For the foregoing reasons, Applicants respectfully submit that the Examiner has failed to state a prima facie case of obviousness of the invention disclosed and claimed in claims 1, 12 and 22.

**6. The Dependent Claims Further Distinguish over the Prior Art.**

With respect to claims 22, 25 and 26 Applicants note that claim 22 defines substantially the same invention as described in claims 1 and 12, and therefore is patentable over the prior art for the same reasons as are claims 1 and 12.

With respect to claims 2, 3, 13-16, 23 and 24, Applicants traverse the rejection of these claims for the same reasons as above. In particular, Applicants respectfully submit that, even if Tanimoto does disclose the metals, Tanimoto fails to disclose immersion plating.

With respect to claims 10, 11, 20, 21, 28 and 29, Applicants respectfully submit that there is nothing in either Nakayama or Tanimoto which would indicate that the claimed features would be obtained. The Examiner is relying on inherency in making this assertion. First of all, inherency is not applicable to obviousness. Second, for inherency to apply to anything, the result must necessarily be obtained, and the fact that the result would necessarily be obtained must be immediately recognized by those of ordinary skill in the art. To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. v. Monsanto Co.*, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.* at 1749 (quoting *In re Oelrich*, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981)). Applicants respectfully submit that the Examiner has failed to show that these claimed features would be inherent in either reference or in the asserted combination.

Docket No. MCGEP0178USASerial No. 10/002,714**CONCLUSION**

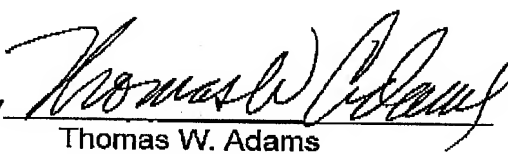
For the foregoing reasons, Applicants respectfully submit that the presently claimed invention would not have been obvious over Nakayama in view of Tanimoto. Applicants respectfully submit that the presently claimed invention patentably distinguishes over the prior art. Applicants respectfully submit that the herein-submitted drawing figure contains no new matter, and provides the drawing requested by the Examiner.

Accordingly, Applicants respectfully submit that the present application is in condition for allowance, and request notice to such effect.

If the Examiner considers that a telephone interview would expedite prosecution, Applicants request that the Examiner telephone the undersigned to expedite allowance of the application. No additional fees are believed required as a result of the present paper; however, in the event such fees are required, the Commissioner is authorized to charge those fees to Deposit Account #18-0988, Docket No. MCGEP0178USA.

Respectfully submitted,

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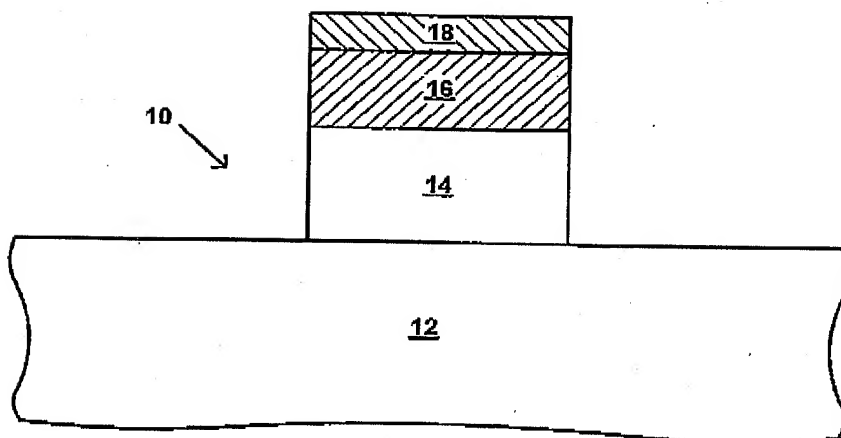


Fig. 1